Ordering number: EN3342B

Monolithic Linear IC



No.3342B

LA1875M

Single-chip, Electronic Tuner for Car Stereos

OVERVIEW

The LA1875M is an electronic tuner IC that incorporates AM, FM IF and MPX circuit sections on a single chip, making it ideal for use in car stereo equipment.

The LA1875M features an antenna-damping AM AGC circuit with rapid charge and discharge characteristics. It also features an S-meter driver, tuning and FM-stereo LED outputs, FM soft-mute and forced-mono modes and a no-adjustment MPX VCO.

The LA1875M AM circuit comprises a mixer, oscillator, RF AGC, IF amplifier and IF buffer. The FM IF circuit comprises an IF amplifier, quadrature detector, and AFC and IF buffer outputs. The MPX circuit comprises a VCO and stereo noise control (SNC) and high-cut control (HCC) circuits.

The LA1875M operates from a 7 to 10 V supply and is available in 36-pin MFPs.

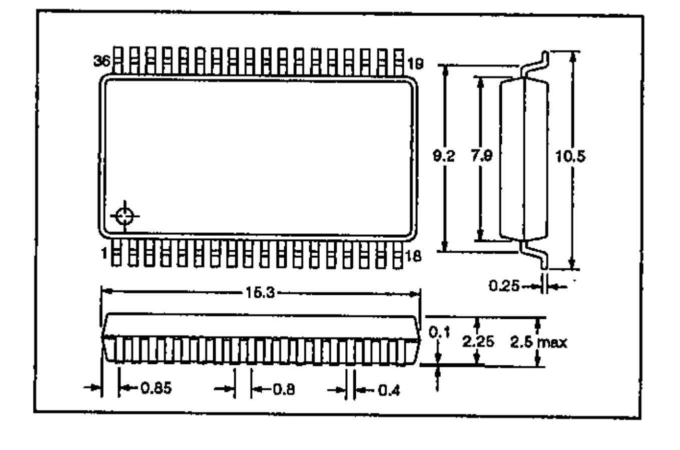
FEATURES

- AM, FM IF and MPX circuits
- Antenna-damping AM AGC circuit with rapid charge and discharge characteristics
- S-meter driver
- Tuning and FM-stereo LED outputs
- AFC and IF buffer outputs
- AM mixer, oscillator, AGC, IF amplifier and IF buffer
- FM IF amplifier, quadrature detector
- MPX no-adjustment VCO, SNC and HCC
- FM soft-mute and forced-mono modes
- 7 to 10 V supply
- 36-pin MFP

PACKAGE DIMENSIONS

Unit: mm

3129-MFP36S



SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	11	V
Power dissipation ($T_a \leq 50$ °C)	P_D	720	mW
Operating temperature range	Topr	–30 to 80	°C
Storage temperature range	T_{stg}	–40 to 150	°C

Recommended Operating Conditions

$T_a = 25$ °C

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	8.5	V
Supply voltage range	V_{CC}	7 to 10	V

Electrical Characteristics

FM characteristics

$V_{CC} = 8.5$ V, $T_a = 25$ °C, $f_c = 10.7$ MHz, $f_m = 1$ kHz, 75 kHz deviation unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Quiescent supply current	I_{CCO}	No signal	21	31	41	mA
–3 dB limiting sensitivity	–3dBLS	Referred to V_I = 100 dBμ. Mute is ON.	27	37	47	dBμ
Tuning LED turn-on input voltage	V_{LED}	V_{26} = 2 V	43	58	73	dBμ
Detector output voltage	V_O	V_I = 100 dBμ	165	250	345	mV
S-meter output voltage	V_{SM}	No signal	0	0.15	0.7	V
		V_I = 100 dBμ	5.0	6.1	7.0	
IF buffer output voltage	V_{IF}	V_I = 80 dBμ, V_{12} = 5 V	200	360	540	mV
SNC output voltage	V_{SUB}	V_I = 100 dBμ, V_{34} = 0.1 V. See note.	–	0.5	5.0	mV
Tuning LED turn-on bandwidth	BW_{LED}	V_I = 100 dBμ, $V_{26} \geq 2$ V	85	130	180	kHz
Signal-to-noise ratio	S/N	V_I = 100 dBμ	66	74	–	dB
AM suppression ratio	AMR	V_I = 100 dBμ at 1 kHz with 30% AM modulation	38	60	–	dB
Separation	Sep	V_I = 100 dBμ. See note.	30	45	–	dB
Channel balance	CB		–1.5	0	1.5	dB
HCC output attenuation	α	V_I = 100 dBμ, V_{33} = 0.6 V, f_m = 10 kHz. See note.	–10.0	–5.0	–0.5	dB
Stereo LED turn-on pilot tone modulation	LED-ON	V_I = 100 dBμ	1.8	3.2	5.0	%
Stereo LED turn-off pilot tone modulation	LED-OFF	V_I = 100 dBμ	–	2.2	–	%

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Total harmonic distortion	THD	V_I = 100 dBμ, mono signal	–	0.5	2.5	%
		V_I = 100 dBμ, main channel signal	–	0.5	2.5	

Note

V_I comprises 90% left + right signal and 10% pilot signal.

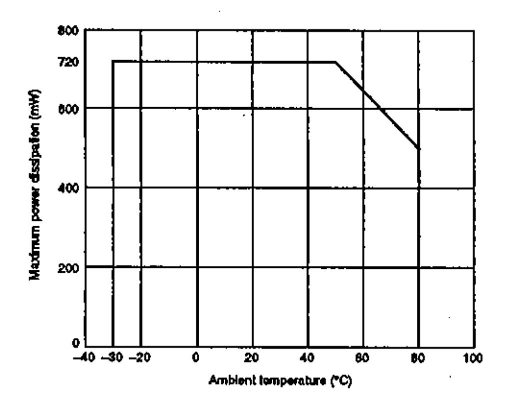
AM characteristics

V_{CC} = 8.5 V, T_a = 25 °C, f_c = 1 MHz, f_m = 1 kHz with 30% modulation

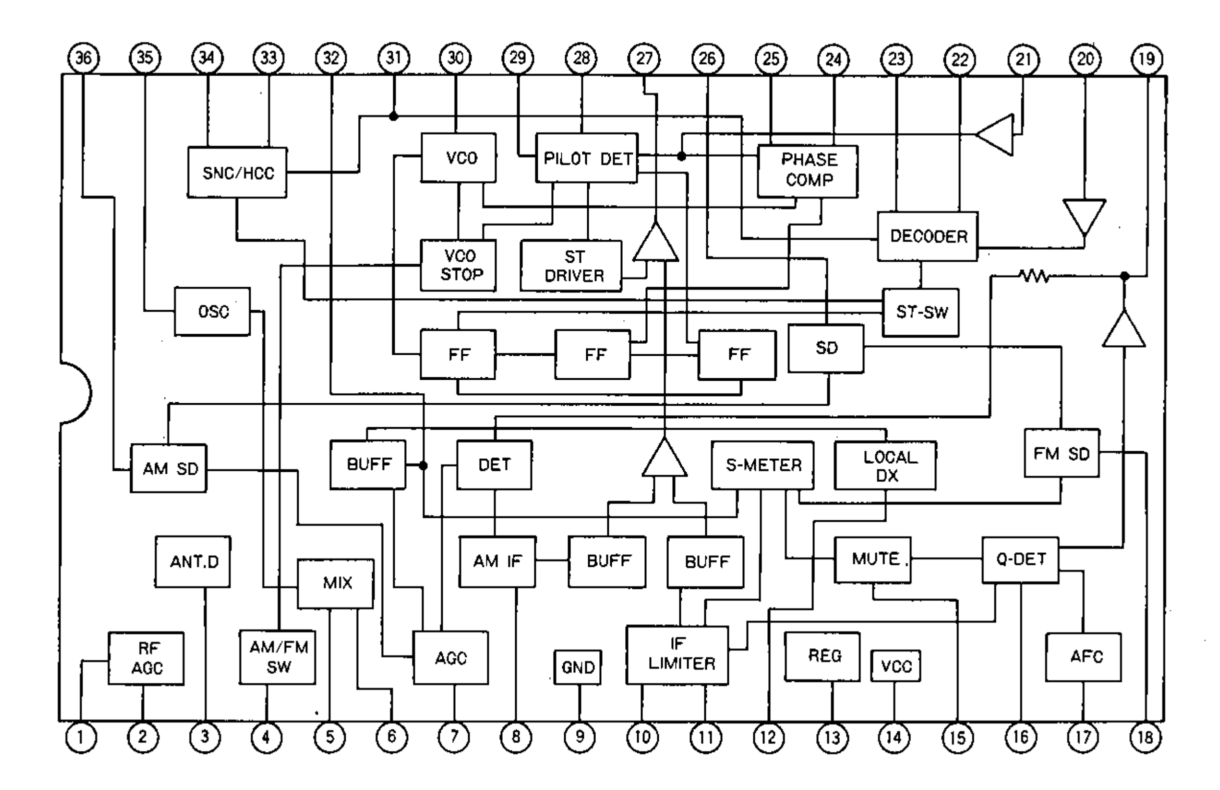
Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Quiescent supply current	I_{CCO}	No signal	15	24	33	mA
Tuning LED turn-on input voltage	V_{LED}	V_{26} = 2 V	21	30	39	dBμ
RF AGC turn-on input voltage	V_{AGC}	V_1 = 3 V	50	57	64	dBμ
Detector output voltage	V_O	V_I = 25 dBμ	18	40	68	mV
		V_I = 74 dBμ	70	105	156	
IF buffer output voltage	V_{IF}	V_I = 50 dBμ, V_{12} = 5 V	150	260	390	mV
S-meter output voltage	V_{SM}	No signal	0	0.7	1.3	V
		V_I = 74 dBμ	2.6	3.7	5.2	
Pin-diode driver current	I_{antd}	V_1 = 0.7 V	2.0	2.5	3.0	mA
Signal-to-noise ratio	S/N	V_I = 25 dBμ	17	21	–	dB
		V_I = 74 dBμ	42	49	–	
Total harmonic distortion	THD	V_I = 74 dBμ	–	0.35	1.0	%
		V_I = 130 dBμ	–	0.4	2.0	

Typical Performance Characteristics

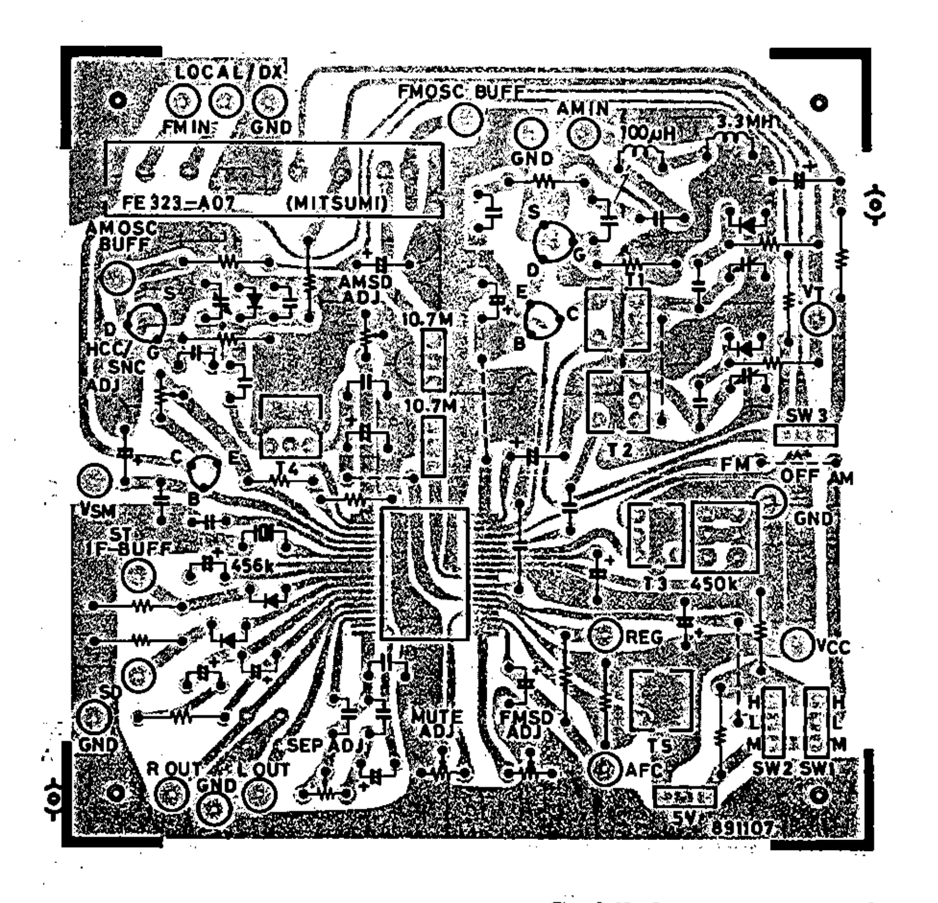
Maximum power dissipation vs. ambient temperature



Block Diagram

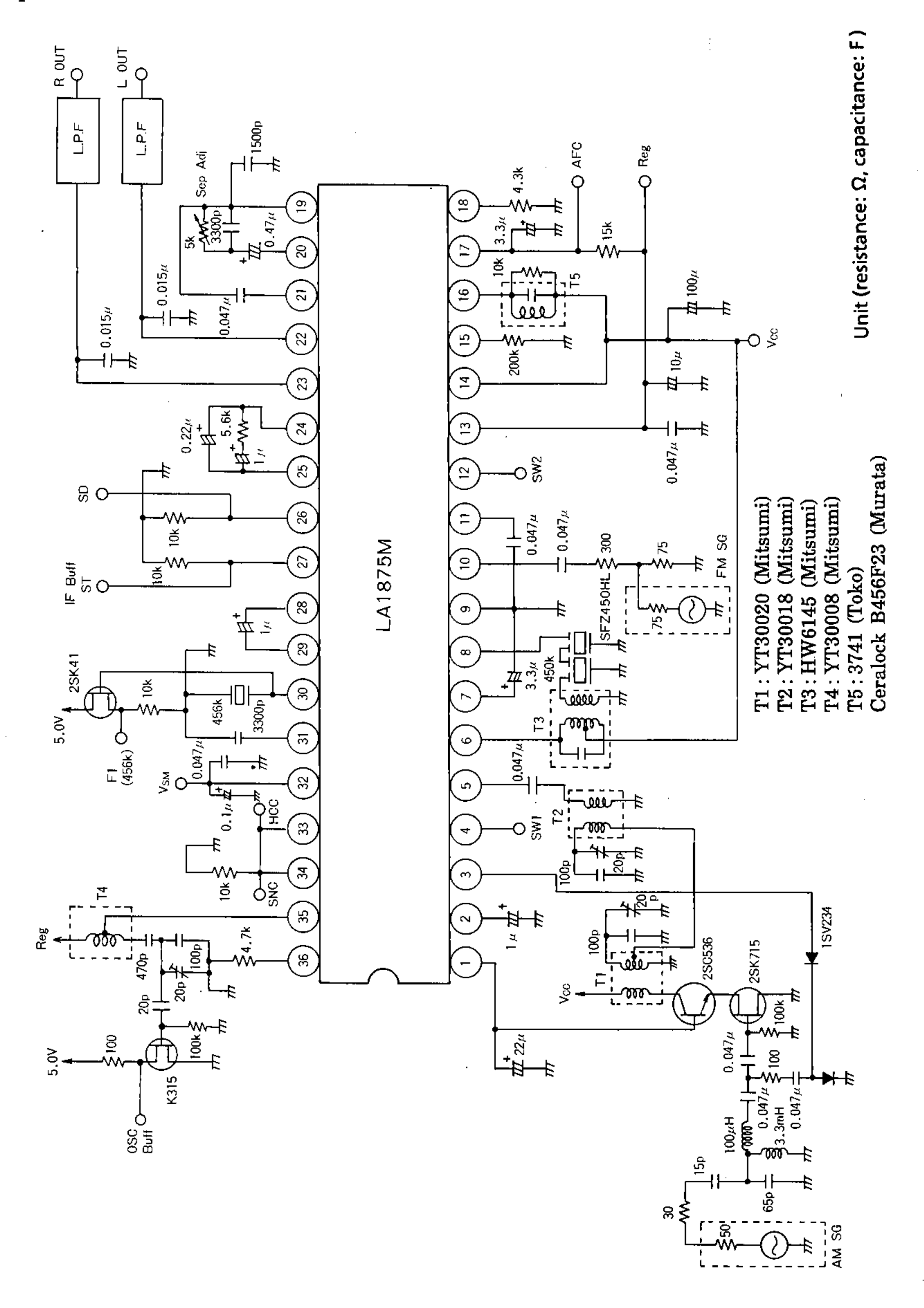


Sample Printed Circuit Pattern

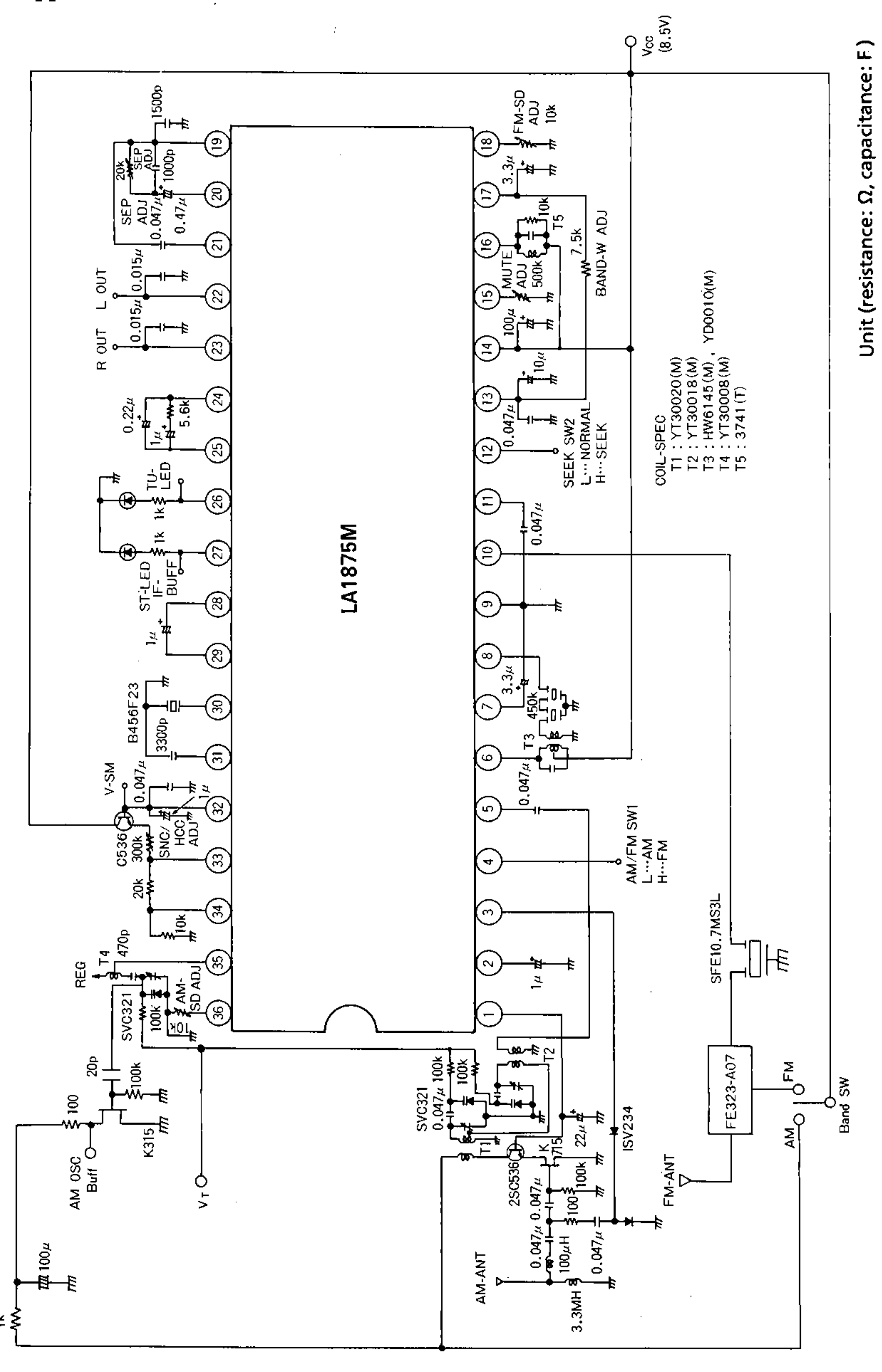


Cu-foiled area 90×90mm²

Specified Test Circuit

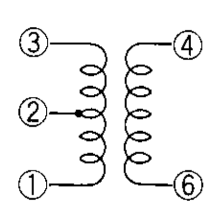


Sample Application Circuit



LA1875M Coil Specifications

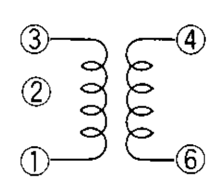
T1 RF double tuning coil (Primary)



L1 – 3 = 224μH

YT-30020 (Mitsumi)
① – ② 2T
⑥ – ④ 37T
② – ③ 82T

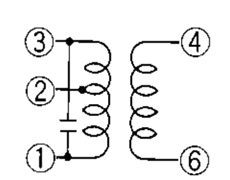
T2 RF double tuning coil (Secondary)



L1 – 3 = 224μH

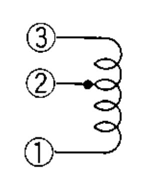
YT-30018 (Mitsumi)
① – ② 2T
⑥ – ④ 15T
② – ③ 82T

T3 AM IFT Coil (Matching Coil for SFZ 450 HL3)



HW-6145 (Mitsumi)
③ – ② 67T Q_O = 70 ± 20%
② – ① 85T f = 450kHz
⑥ – ④ 10T internal 180pF

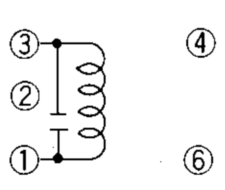
T4 AM OSC Coil



L1 – 3 = 118μH

YT-30008 (Mitsumi)
① – ② 29T
② – ③ 29T

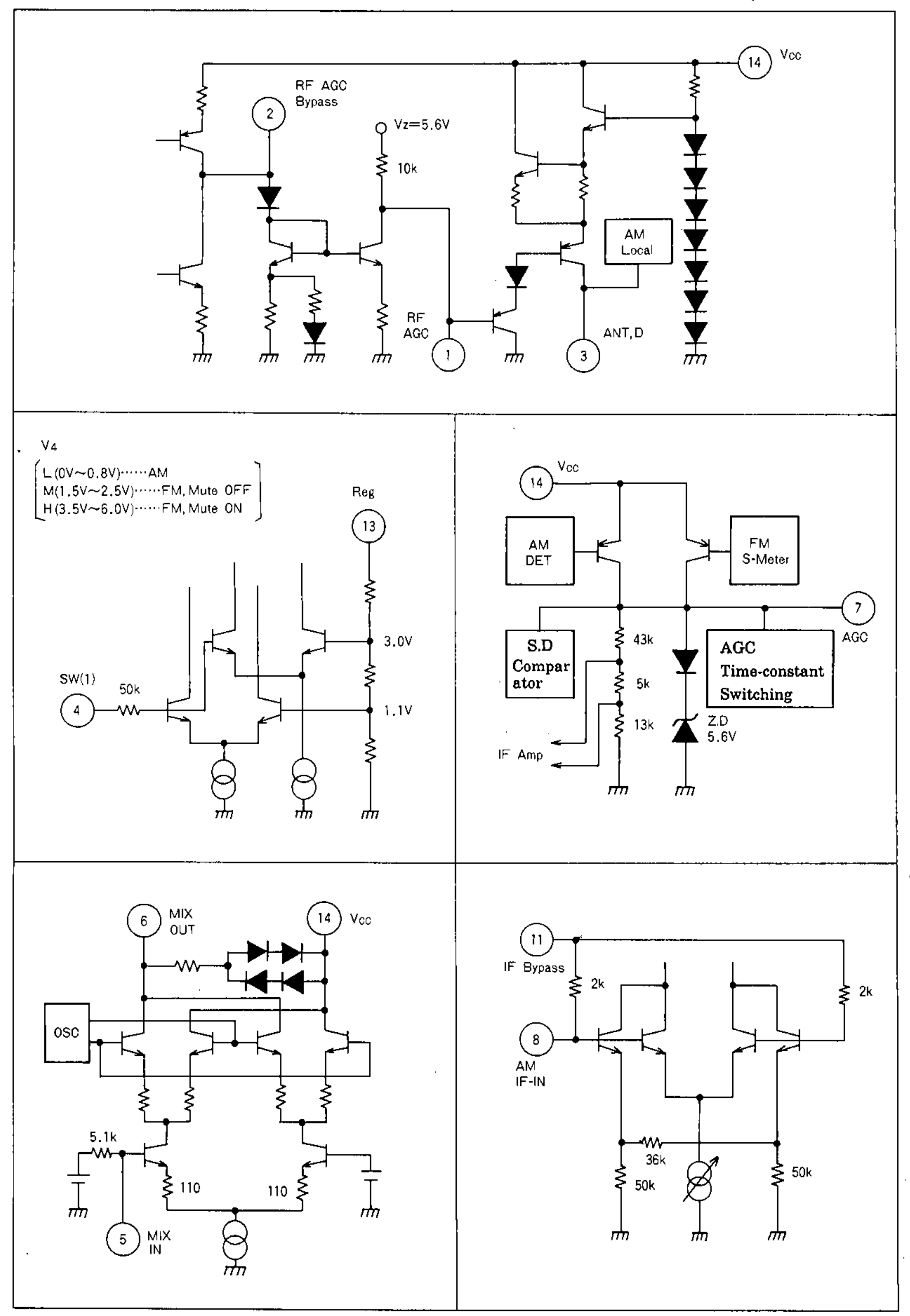
T5 FM DET Coil



292TEAS-3741Z (Toko)
① – ③ 21T
f = 10.7MHz
internal 82pF
Q_O = 38 ± 20%

IC Internal Equivalent Circuit Diagrams

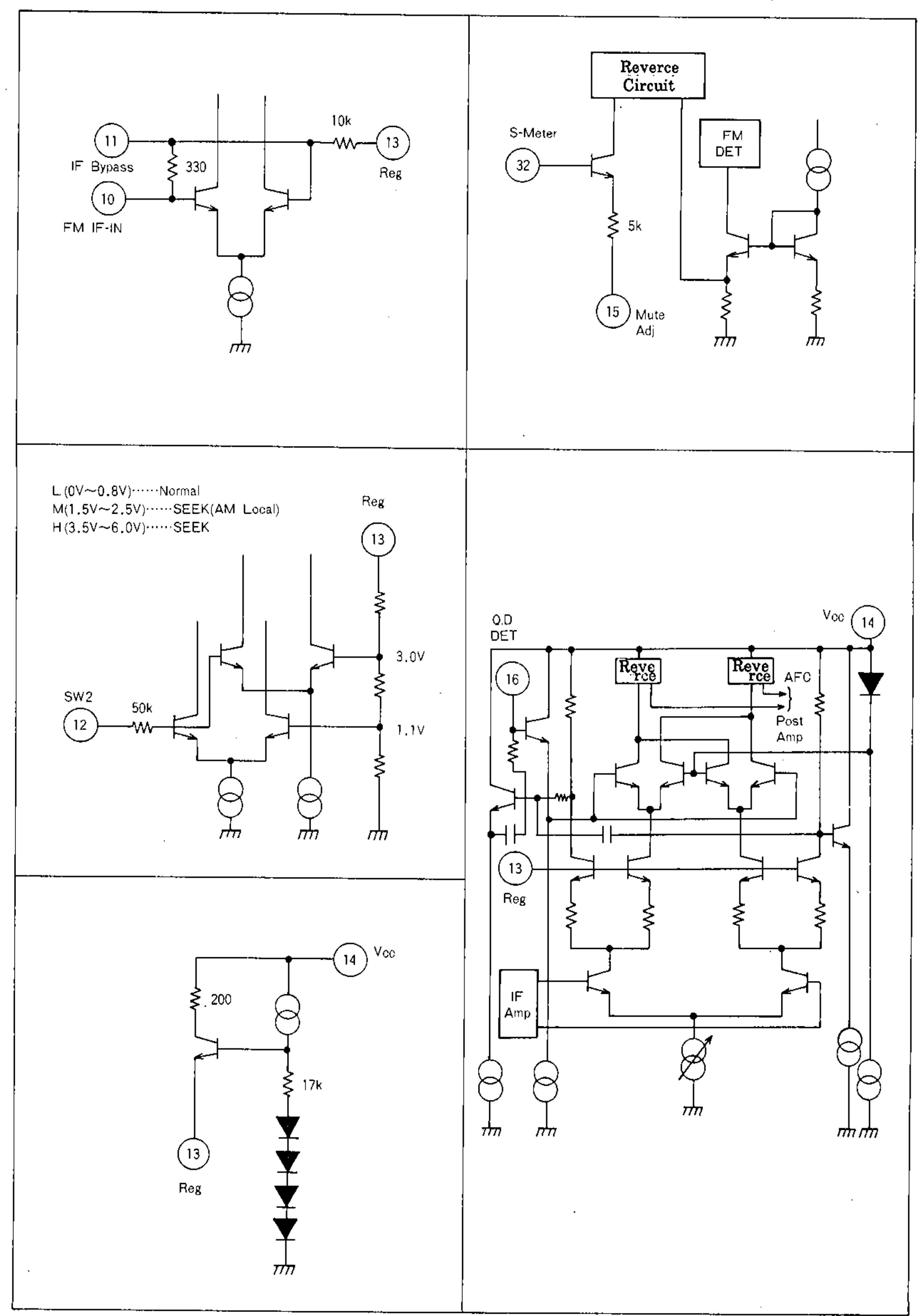
Unit (resistance: Ω)



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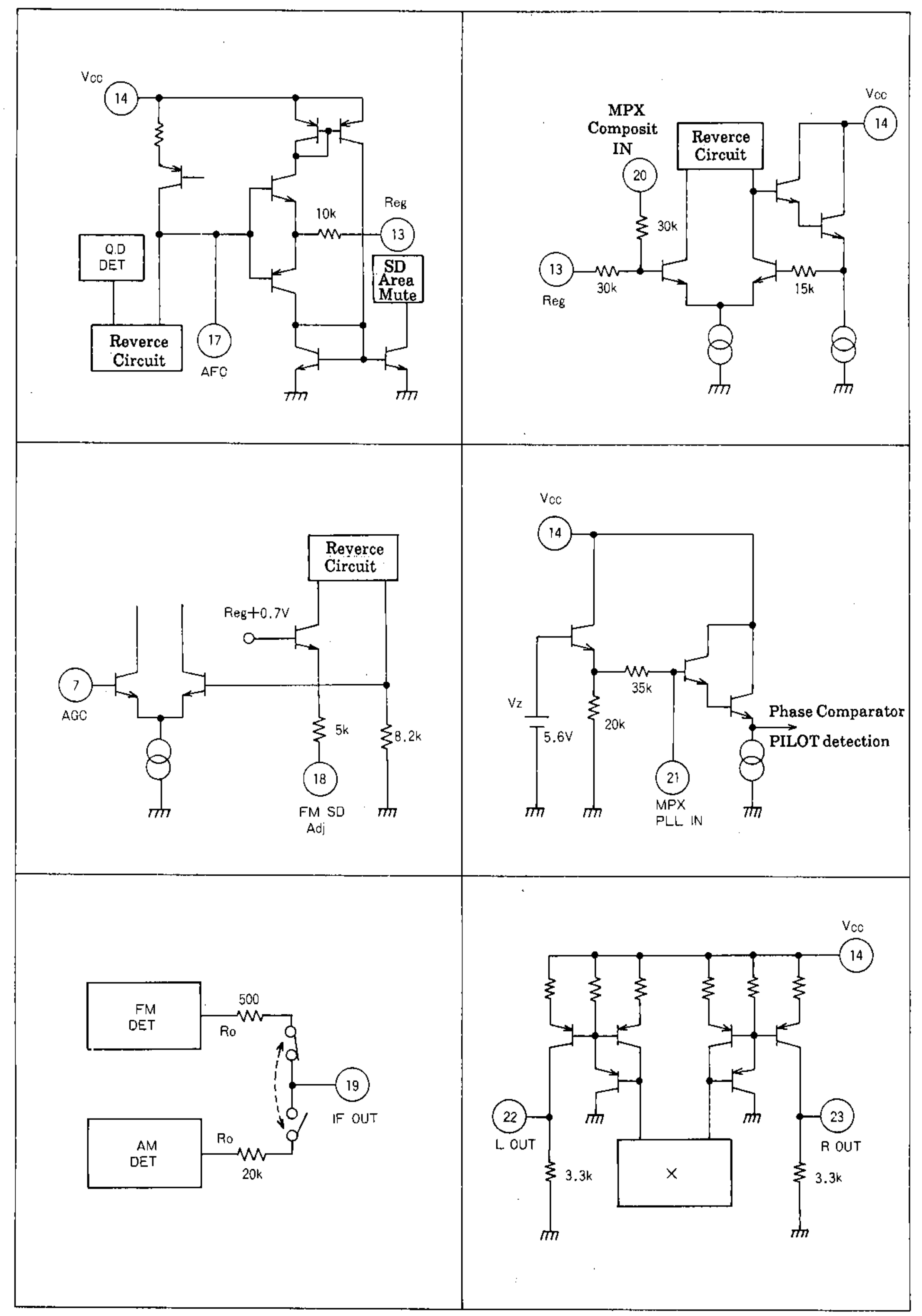
Unit (resistance: Ω)



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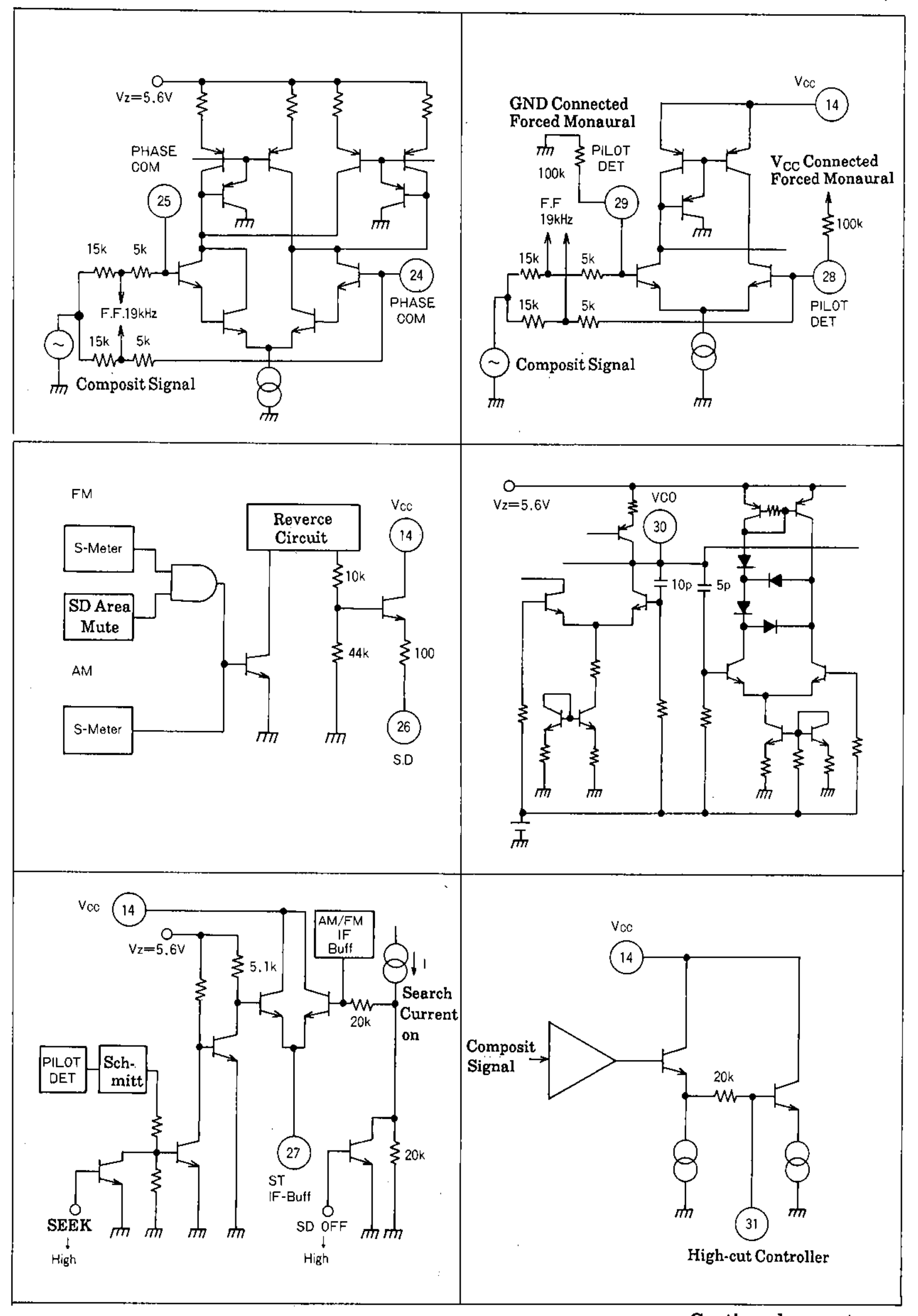
Unit (resistance: Ω)



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Unit (resistance: Ω)



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Unit (resistance: Ω)

